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Notwithstanding the difference it is easy to see that one form is the derivative of the other, and it is probable that the elephantine form was evolved from the mastodont form, as the teeth of the mastodon are of a more ancient pattern or type, that is to say, they accord more nearly with the usual pattern of the molars of ancient pachyderms.

By simple multiplication of the transverse lobes of the molar crowns of the mastodon, contracting these lobes, elongating them so as to encroach on the position of the fangs, and filling the intervals with cementum, we have the elephant molars produced. The miocene stegodons of the Himalayas were elephants with teeth decidedly of intermediate character in these respects, with the true elephants and the mastodons.

This mode of complication of the molar teeth in the evolution of the elephant pattern from the mastodon pattern was a very common one among the ungulates. Most of the early ruminants, as Oreodon, Agriochoerus, etc., and the solipeds, as Anchitherium, had molars with short crowns and prominent lobes, inserted with fangs. Their successors, as exemplified in most living ruminants and the horses, have molars with long crowns, complicated in the same manner as we observe in the elephant as compared with the mastodon.

Nearly all our domestic herbivorous ungulates belong to genera having long-crowned, complicated molars, as exemplified in the elephant, horse, camel, ox, sheep, and goat. The deer retains the more ancient pattern of molars.

That the course of evolution was from the more simple to the more complicated type would appear to be confirmed in the fact that the temporary molars have proportionately shorter crowns and longer roots than in those of the permanent series.

The death of Prof. Agassiz was announced by the Chair, and a committee consisting of Drs. Le Conte, Carson, and Leidy was appointed to draft resolutions of regret.

DECEMBER 23.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-seven members present.

The following paper was presented for publication :—

"On Three New Species of Unionidæ of the United States." By Isaac Lea.

Prof. COPE made some remarks on fishes from the coal measures at Linton, Ohio. He stated that Prof. Newberry, Director of the Geological Survey of Ohio, had sent to him numerous specimens of fishes and batrachians for determination and description. Among these he had discovered batrachians (*Colosteus*, Cope) which were labelled and had been described as fishes (*Pygopterus scutellatus*, Newb.), and fishes (*Conchiopsis* and *Peplorhina*, Cope) some of which were labelled "Amphibian or Reptilian." Having determined the latter to be fishes and described them, Prof. Cope now called attention to a note of Prof. Newberry on the latter, read at the last meeting of the Academy, in which he states, (1) that *Peplorhina anthracina* is a batrachian; (2) that it is identical with *Conchiopsis exanthematicus*, Cope; (3) that *C. filiferus* is *Coelacanthus elegans*, Newb.; (4) that the dentition described by me is not that of *Coelacanthus;* and that (5) the genus is the same as that described by Agassiz forty years ago as *Coelacanthus.*

To these propositions Prof. Cope replied, that (1) Additional evidence derived from two specimens of *Peplorhina anthracina*, Cope, recently studied, confirms the view that it is a fish, which evidence is given below; (2) That neither of the two specimens exhibits in its cranial bones the characters of *C. exanthematicus*, though both sides are exhibited. They show, however, that the latter should be referred to the genus *Peplorhina*, since among other points they present the same type of teeth, which I find labelled on one of them "ova?"; (3) Prof. Newberry's identification of the species *C. filiferus* with *Coelacanthus elegans* is doubtless correct;[1] but (4 and 5) Its reference (with that of similar species) to Agassiz's genus is not warranted, until it is found to possess an osseous natatory bladder (which Prof. N. states in the Geological Survey of Ohio that he could not find in any of his five hundred specimens), and osseous ribs and the type of dentition are discovered in *Coelacanthus granulatus*, the type of the genus.

One of the new specimens of *Peplorhina*[2] displays the lower side of the cranium, and on it two large jugular bones, one on each side, on the inner side of the mandible. They are elongate, the posterior border oblique, so as to present an apex on the inner side; the inner edge is thin, the outer thickened; the surface smooth, with a very obscure longitudinal striation. Between their anterior extremities is a subround disciform bone in the position of the basi or glosso-hyal. The mandibular rami extend round its anterior margin, and posteriorly nearly to the end of the jugular. The symphysis is a curious interdigitation of three fingers into as many notches, and the dentaries near them are marked with symmetrical pores, which look like the exits of mucous ducts. Three are on the superior, and two on the inferior margin of the bone, and a sixth is immediately between the upper and lower inner ones. These pores correspond with the mucous ducts of the lateral line observed in the scales of the type. The teeth are numerously placed in a patch on the vomer, or at least the roof of the mouth, and are short, conic, acute, and smooth. They are discoverable as far backwards as the anterior end of the jugular plates. The large opercular bones are smooth, and the head is covered above with nearly smooth, thin scuta. The head is wide behind, and though contracted forwards, the muzzle is broadly obtuse. Irregular masses, perhaps remains of cartilage, follow the skull in which a few ribs are scattered.

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[1] Though no one could suppose so from his imperfect figure, Geol. Surv. Ohio, Pl. 40, Fig. 1.

[2] Proceedings of the Academy, 1873, p. 343.

The other specimen displays the smooth operculum patch of vomerine teeth, and several separated scuta of the surface of the cranium. These have rounded angles, one or more convex sides, and very obscure radiating ridges.

The characters relied on as indicative of the reference of *Peplorhina* to the fishes, are (1) the presence of opercula like those of *Conchiopsis;* (2) the presence of jugular bones, and (3) of oval imbricated scales; (4) the absence of ambulatory limbs. The thin scutiform cranial bones, the dense patch of vomerine teeth, and the mucous ducts of the bones and scales were all ichthyic characters. As no limbs had been discovered in three specimens preserved in the appropriate regions, their nature, if existing, could not be determined at present.

Prof. Cope brought before the Academy some results derived from study of material obtained by him during the preceding summer in the miocene formations of Colorado. He announced the discovery of the first fossil monkey of the miocene of America, giving it the name of *Menotherium lemurinum.* He regarded it as allied to the *Tomitherium* of the Bridger Eocene, and as the representative of the more numerous group of the lemuroids, which he had discovered in the latter formation. He stated that there are three tubercular molars and a sectorial-like premolar in front of them ; that this tooth is preceded either by a more elongate premolar with two roots, or by two single-rooted premolars. The molars each support four tubercles in nearly opposite pairs, the inner anterior connected with the outer posterior by a diagonal ridge; the last premolar compressed with obtuse apex, broad heel, and anterior tubercle. Size that of a domestic cat. Prof. Cope stated that his recent discovery of snakes, lizards, and lemurs of forms allied to those previously discovered by Prof. Marsh and himself in the Eocene of Wyoming, constituted points of affinity to the fauna of that period not previously suspected. He also observed that he had discovered some additional species of *Ruminantia* allied to the musk, and to the *Leptomeryx evansii*, Leidy, which he named *Hypisodus minimus*, and *Hypertragulus calcaratus*, and *H. tricostatus.* The first was the least of the order, not exceeding a cat-squirrel in size. *Hyper-*

tragulus differs from *Leptomeryx* in the isolation of the first premolar, as in the camels, and in the sectorial character of the penultimate premolar. The temporary premolars had the form of the pennant corresponding teeth in *Leptomeryx.*

Prof. Cope also mentioned two interesting observations on Ungulate species of the Western Pliocene formation. He found that the horses of the genus *Protohippus* were provided with three toes, as in *Hippotherium;* skeletons of *P. sejunctus*, Cope, and *P. placidus*, Leidy, having furnished the parts in question.

The other fact ascertained was the existence of a complete series of superior incisor teeth in certain camels of the same period. The observation was made on the cranium of an adult *Procamelus heterodontus*, Cope, sp. nov. The alveoli were completely preserved, but it was thought that their appearance indicated the easy shedding of the teeth.

On Circulatory Movement in Vaucheria.—Prof. LEIDY made some remarks on the intra-cellular circulation of plants, as exemplified in the hairs of the Mullein, the leaf-cells of Vallisneria, etc. The moving streams of protoplasm he likened to amœboid movements, and expressed the opinion that they were of the same character. In the common alga, *Vaucheria*, the filaments of which consist of very long cells, comparable to those of Nitella or Chara, he had observed an apparent motion of the cell contents, which is somewhat peculiar and, at least, is not generally mentioned by writers. The wall of the cells is invested on the interior with a layer of tenacious protoplasm, containing the thinner liquid cell contents as usual. The parietal protoplasm is closely paved with green granules, and these appear very slowly but incessantly to change their position in relation with one another. The motion is so slow that it was a question for some time whether it did actually occur, but it appears sufficiently obvious if observed in relation with the lines of a micrometer, and its existence was confirmed by several friends whose attention was directed to it.

In behalf of the committee, Prof. CARSON made the following report:—

In accordance with the resolutions passed at the last meeting of the Academy, upon the announcement by the chairman of the death of Prof. Agassiz, that a committee be appointed to prepare such a testimonial as would express the sentiment of the Academy upon the loss of so distinguished a member, and be proper to be placed upon the minutes as a record of the high appreciation entertained by it of his services to science, the committee reports the following:—

Resolved, That in the death of Professor Louis John Rudolph Agassiz the Academy of Natural Sciences of Philadelphia has lost one of the most illustrious of the associates whose names have graced the list of members of the institution.

Resolved, That the Academy fully recognizes the fact that by the death of one whose works and reputation shed lustre upon the pursuit of natural science, not only this country, but the intellectual world, has sustained a loss which will not easily be replaced.

Resolved, That, with the grief we would express for his loss as one of the most eminent of modern naturalists, we cannot withhold the attestation of our gratitude for the course he took of becoming a citizen of the United States, and for his untiring devotion to the development of the natural history of this continent, thus having identified himself with American science, of which he was a leading and most successful explorer.

Resolved, That while his life and career were models to be imitated by the student of nature, his genial temper, estimable qualities and high honorable motives as a man endeared him to all who came within his influence, and have left the most pleasurable recollections of his person and character.

Resolved, That we deeply sympathize with those in whose immediate behalf and for whose advancement his talents and energy have been expended, and express the hope that the impulse he has given to their labors may be continued, and that the interest he aroused within the immediate circle of his efforts may not be lost, but continue as a tribute to his worth and the perpetuation of his fame.

Resolved, That we fully appreciate the extent of the bereavement which, under Providence, has befallen the family and friends of Prof. Agassiz, and beg to express our heartfelt participation in the sorrow experienced by them.

The resolutions were adopted unanimously, and the President of the Society was instructed to transmit a copy of them to the widow of Prof. Agassiz.

DECEMBER 30.

The President, Dr. RUSCHENBERGER, in the chair.

Forty-one members present.

The following paper was presented for publication: "Remarkable Variations in Coloration, Ornamentation, etc., of certain Larvæ of Nocturnal Lepidoptera." By Thos. G. Gentry.

The following were elected members: John Welsh, Jr., Thos. H. Powers, Jas. M. Fox, Daniel Neall, Frank D. Lankenau, Wm. L. Schaffer, Samuel L. Smedley, Mrs. S. R. Barton.

Prof. Burt G. Wilder, of Ithaca, N. Y., Prof. J. Henle, of Göttingen, and Townshend S. Brandegee, of Cañon City, Colorado, were elected correspondents.

On report of the committees, the following papers were ordered to be printed:—